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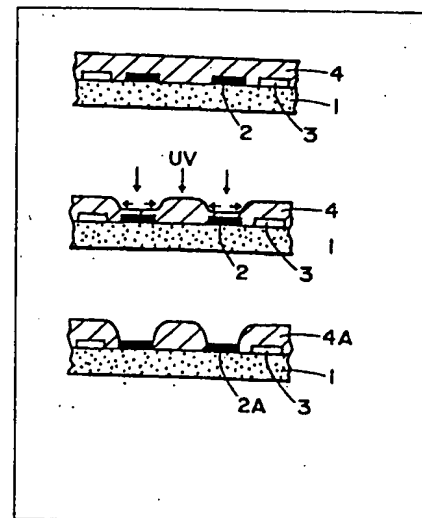
## WPI

- TI - Embossed printed plate prodn. - by printing with ink contg. hardening retardant and liq. repellent, applying resin compsn. and UV-irradiating
- AB - J61291075 A baseplate is printed with an ink contg. hardening-retarding agent (I) and liq.-repelling agent (II). A layer of resin-compsn. contg. UV-setting resin (III) is formed on it, and the resin layer is hardened by UV irradiation.
- Examples of (I) are metal chelating agent, and acrylate, benztriazole derivs. and quinones having organic acid or carboxyl gps. As (II), silicone, polyethylene wax, paraffin wax, etc. are useful. The vehicle of the ink is e.g., phenol, urea, epoxy, polyester and polyurethane resins. Examples of (III) are polyester (meth)acrylate, polyurethane (meth)acrylate, epoxy(meth)acrylate, unsatd. polyester and diallylphthalate resins.
- ADVANTAGE - The method enables prodn. of printed plywood or plate having an emboss fitted to the printed pattern. (0/3)
- PN - JP61291075 A 19861220 DW198705 004pp
- JP6069547B B2 19940907 DW199434 B05D5/06 003pp
- PR - JP19850132175 19850618
- PA - (NIPQ) DAINIPPON PRINTING CO LTD
- (MORO-N) MOROHOSHI INK KK
- MC - A11-B05 A11-C02B A12-A04 A12-B09 A12-W07D
- DC - A32 P42
- IC - B05D1/36 ; B05D5/06 ; B05D7/24 ; B29C59/16 ; B29K101/00 ; B29L7/00
- AN - 1987-033842 [05]

## PAJ

- TI - PREPARATION OF DECORATIVE MATERIAL HAVING TUNING EMBOSSED PATTERN
- AB - PURPOSE: To efficiently obtain a decorative board, in obtaining an embossed pattern aligned with a picture pattern, by using an ultraviolet curable resin and the curing inhibitor thereof in combination to cure said resin.
- CONSTITUTION: An arbitrary picture pattern is printed on a base material as shown by a numeral 2 by using ink to which a curing inhibitor and a liquid repellent agent were added and general printing is applied as shown by a numeral 3 by using general ink. A surface resin layer 4 containing an ultraviolet curable resin of which the curing reaction was suppressed by the curing inhibitor is provided thereon and irradiated with ultraviolet rays under liquid repellent action to be cured. By this treatment, the printed part 2 of the picture pattern comes to a recessed part by this treatment to form a picture pattern layer 2A. A numeral 4A shows the surface resin layer after curing. As a water repellent agent, silicone is used and a metal chelate is used as the curing inhibitor and a phenolic thermosetting resin is used as a vehicle.
- PN - JP61291075 A 19861220
- PD - 1986-12-20
- ABD - 19870522
- ABV - 011159
- AP - JP19850132175 19850618
- GR - C423
- PA - DAINIPPON PRINTING CO LTD; others: 01
- IN - AOYAMA KENSUKE; others: 01
- I - B05D5/06 ; B05D1/36 ; B05D7/24 ; B29C59/16
- SI - B29K101/00 ; B29L7/00

G1-291075



PTO 2003-1119

Japan, Kokai

61-291075

METHOD FOR MANUFACTURING FACING MATERIAL

WITH SYNCHRONOUS EMBOSS

[Docho Enbosu O Yusuru Keshozai No Seizo Hoho]

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UNITED STATES PATENT AND TRADEMARK OFFICE

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<u>Foreign Language Title</u>	:	Docho Enbosu O Yusuru Keshozai No Seizo Hoho
<u>English Title</u>	:	METHOD FOR MANUFACTURING FACING MATERIAL WITH SYNCHRONOUS EMBOSS

1. Title of the Invention: METHOD FOR MANUFACTURING FACING MATERIAL WITH SYNCHRONOUS EMBOSS

2. Claims

1. A method for manufacturing a facing material with a synchronous emboss, characterized by the fact that in a method for manufacturing a facing material with an emboss synchronous with a pattern, an optional pattern is printed on a base material by using an ink to which a curing suppressor and a liquid repellent are added; and a surface resin layer containing an ultraviolet-curable resin in which a curing reaction is suppressed by the curing suppressor is installed on it and cured with ultraviolet rays, so that the pattern part is concaved.

2. The manufacturing method of Claim 1, characterized by the fact that the pattern is printed with the ink comprised of the liquid repellent being selected from silicone, polyethylene wax, paraffin wax, amide wax, wax, and vinyl fluoride compound, the curing suppressor being selected from metal chelating agent, organic acid, acrylate having a carboxyl group, benztriazole derivative, and quinones, and a vehicle being selected from thermosetting resins such as phenol group, urea group, melamine

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\* Numbers in the margin indicate pagination in the foreign text.

group, epoxy group, polyester group, and polyurethane group.

3. The manufacturing method of Claim 1, characterized by the fact that the component for forming the surface resin layer is selected from ultraviolet-curable polyester (meth)acrylate, polyurethane (meth)acrylate, epoxy (meth)acrylate, unsaturated polyester resin, and diallyl phthalate.

### 3. Detailed explanation of the invention

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(Purpose of the invention)

(Industrial application field)

The present invention pertains to a method for manufacturing a facing material that has an emboss synchronous with a pattern and has excellent in heat resistance and wear resistance.

(Prior art)

As a method for forming an emboss synchronized with a pattern in a facing material, a method that prints a pattern with an ink to which a curing suppressor is added, spreads a curable resin on it, and obtains a synchronous emboss by curing with ultraviolet rays, for instance, is applied. In the method, it is necessary to thicken the curing resin film to form sufficient recessions and projections, and the productivity is low, so that the cost is raised. Furthermore, since the recessed surface is not cured, the properties of the part are poor.

There is also a synchronous embossing method that prints a pattern with an ink containing a liquid repellent and cures it in a state in which a surface resin layer being mounted on the

pattern is repelled. However, the repellency effect is unstable, and the sharpness of concave and convex parts is deficient.

(Problems to be solved by the invention)

The purpose of the present invention is to provide a method for manufacturing a facing material, which has an emboss synchronized with a pattern and has a high design characteristic, at low cost.

(Constitution of the invention)

(Means to solve the problems)

The method for manufacturing a facing material with a synchronous emboss is characterized by the fact that an optional pattern is printed on a base material by using an ink to which a curing suppressor and a liquid repellent are added; and a surface resin layer containing an ultraviolet-curable resin in which a curing reaction is suppressed by the curing suppressor is installed on it and cured with ultraviolet rays, so that the pattern part is concaved.

As the base material, there are asphalt, glass wool, paper, plywood, fabric, polyvinyl chloride, metal plate, cement plate, etc., and it is appropriately selected in accordance with usages.

The liquid repellent is selected from silicone, polyethylene wax, paraffin wax, amide wax, wax, vinyl fluoride compound, etc.

The curing suppressor is selected from metal chelating agent, organic acid, acrylate having a carboxyl group, benztriazole derivative, quinones, etc. In particular, the metal chelating agent is most effective, and it is mixed at 1-20%, preferably 1-

10% in the ink. As the metal chelating agent, in addition to aliphatic carboxylic acids such as oxalic acid, succinic acid, malonic acid, citraconic acid, citric acid, tartaric acid, isocitric acid, pyruvic acid, glycollic acid, thioglycollic acid, and diglycollic acid, aromatic carboxylic acids such as salicylic acid, mandelic acid, benzoic acid, salicylaldehyde, and chromotropic acid, or aldehyde,  $\gamma$ -oxyquinoline, acetylacetone, dimethyl glyoxime, 1,10-phenanthroline and its derivative, benzoylacetone, 2,2'-bipyridyl-dimethyldithiocarbamic acid, hydroquinone, methylhydroquinone, t-butylhydroquinone, N-nitrosodiphenylamine, 2-mercaptobenzoimidazole, p-phenylenediamine, p-hydroxydiamine, tetrahydroquinoline, p-quinone, phenothiazine, 2,6-di-t-butyl-p-cresol-t-butylcatechol, etc., are used.

These two kinds or more can also be used by mixing. Furthermore, if N-nitrosophenylhydroxylamine aluminum salt is used, the printing ink has stability and is useful.

A vehicle is selected from thermosetting resins such as phenol group, urea group, melamine group, epoxy group, polyester group, and polyurethane group.

As a pattern printing using the ink to which the curing suppressor and the liquid repellent are added, any of a direct printing method and a transfer method being generally applied may be used.

The component for forming the surface resin layer is selected from ultraviolet-curable polyester (meth)acrylate,



polyurethane (meth)acrylate, epoxy (meth)acrylate, unsaturated polyester resin, and diallyl phthalate.

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(Operation)

Since the curing suppressor is included in the ink for printing a pattern, curing of the surface resin layer to which the ultraviolet-curable resin whose curing is suppressed by the curing suppressor is added is suppressed in the pattern part. Thus, the surface resin layer containing the ultraviolet-curable resin of the part moves toward the part in which curing is active. With the cooperation of the pulling action of the uncured resin due to active curing in the part in which the curing suppressor does not exist and the action in the extruding direction of the liquid repellent, projections and recessions appear distinctly. Therefore, the pattern part becomes a concave part after curing, and the other part on which the pattern is not printed become a convex part. In this manner, an emboss synchronized with the printed pattern is formed.

This state is shown by a schematic cross section. An optional pattern printing 2 is applied onto a base material by using an ink to which a curing suppressor and a liquid repellent are added, and a general printing 3 is applied with a general ink. Then, a surface resin layer 4 containing an ultraviolet-curable resin of which the curing reaction is suppressed by the curing suppressor is installed on it as shown in Figure 1. Figure 2 shows a state in which curing is applied by irradiating ultraviolet rays under a liquid repellency action.

A state in which the latter printing 2 becomes a concave part after the ultraviolet curing is shown in Figure 3. 2A is a pattern printing layer after curing, and 4A is a surface resin layer after curing.

Also, when the pattern is a wood grain conduit part, the base material is a thermoplastic resin sheet such as polyvinyl chloride, and the conduit part is printed parallel with the winding direction of the sheet, a bent in which the part of the pattern printing 2A and its lower sheet become an upward convex part in the facing material being obtained. This phenomenon is caused by the deformation of a part with a relatively low degree of curing since the sheet is pulled out in the winding direction. In order to prevent this phenomenon, both ears of the sheet are added to the degree that the width of the sheet is not contracted. Thus, a bent in which the part of the pattern printing 2A and its lower sheet become a downward convex part, so that a sense of concave part is increased.

(Application example)

An ink with the following mixture in which a curing pressor and a liquid repellent were added was prepared. "Part" means part by weight.

Acryl polyol	20 parts
Vinyl chloride-vinyl acetate copolymer	5 parts
Silicone wax	8 parts
Amide wax	1 part
Pigment	8 parts

Solvent	56 parts
Aluminum-N-nitrosophenylhydroxylamine	2 parts
	Total 100 parts

A general ink with the following mixture was prepared.

Vinyl chloride-vinyl acetate copolymer	10 parts
Methacrylic acid ester resin	5 parts
Pigment	15 parts
Solvent	70 parts
	Total 100 parts

An ultraviolet-curable paint with the following mixture was prepared.

Urethane acrylate	68 parts
Polyvinyl pyrrolidone	10 parts
TMPTA	7.5 parts
Sensitizer	2 parts
Polyethylene wax	1 part
Microsilica	7 parts
Butyl acetate	5.5 parts
	Total 100 parts

Using the above-mentioned ink to which a curing suppressor and a liquid repellent were added, a gravure printing of a conduit groove part was applied too a colored polyvinyl chloride sheet with a thickness of 0.15 mm, and using the general ink, a gravure printing of parts other than the conduit groove part was carried out. Then, the above-mentioned ultraviolet-curable paint was spread at a thickness of 10  $\mu$  on the entire surface by a roll

coater and irradiated with ultraviolet rays (3 pieces x 80 W/cm high-pressure mercury lamp, 20 m/min).

As a result, an emboss synchronized with the pattern of the ink to which a curing suppressor and a liquid repellent were added was formed, so that a sheet with a high design characteristic having a cubic sense was obtained.

Also, in the above-mentioned application example, when a mixture in which 10 parts isocyanate "Kolonate[transliteration] HL) (made by Nippon Polyurethane Industry Co., Ltd.) was added to 100 parts of the ink to which a curing agent and a liquid repellent were added was used, a sheet with an improved solvent resistance of the surface of the conduit groove part was obtained.

(Effects of the invention)

According to the present invention, even if the surface resin layer is 10  $\mu$  or less, a facing material with a high design characteristic having an emboss synchronized with a pattern can be manufactured at low cost.

#### Brief description of the figures

Figure 1 is a schematic cross section showing a state in which a pattern is printed on a base material and a surface resin layer is installed on it.

Figure 2 is a similar cross section showing a state in which curing is carried out by irradiating ultraviolet rays.

Figure 3 is a similar cross section showing a state in which a pattern printing part becomes a concave part as a result of

ultraviolet-curing.

FIGURES 1-3 KEY:

1 Base material

2 Pattern printing

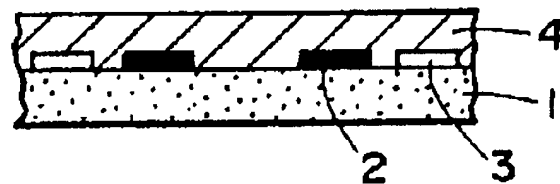
2A Same (after curing)

3 General printing

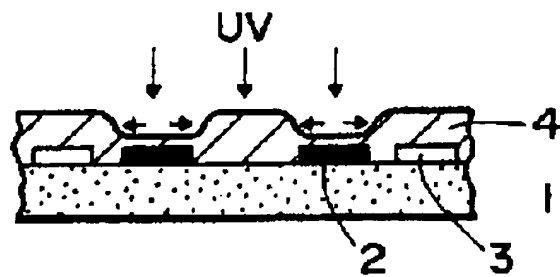
4 Surface resin layer

4A Same (after curing)

第 1 図



第 2 図



第 3 図

